BSA-3800R Service Manual

Ⅰ. Introduction of the Function

BSA-3800R is Digital recorder & player, it is the representative product in DVR series of Wanlida. It can recorder the signal of video tape recorder or of vidicon or of TV to be DVD disc. It supports recording DVD+R/RW discs. It composites two groups of video input, one group of S-video, TV signal etc. Real time clock set , it can support recording programs by presenting time, channel, times of channel and quality level. For example, one DVD+R/W disc of 4.7G will cost 1 hour, 2hours, 3 hours and 4 hours differently with different recording quality level.

BSA-3800R composites video, S-video, RCA video output, 5.1 CH, Optical, Coaxial audio output. Built-in all range of TV frequency Tuner.

Ⅱ. Schematic Diagram

BSA-3800R adopts NEC recorder chip ND-1100A, based on ATAPI jack. The whole system based on ES7010, ES6128 decoder chip, input origin signal and TV signal then transfer to digital signal by SAA7114 decoder. The digital signal will be recorder DVD signal after dealing by ES7010 encoder. The following is the schematic diagram of mainboard:
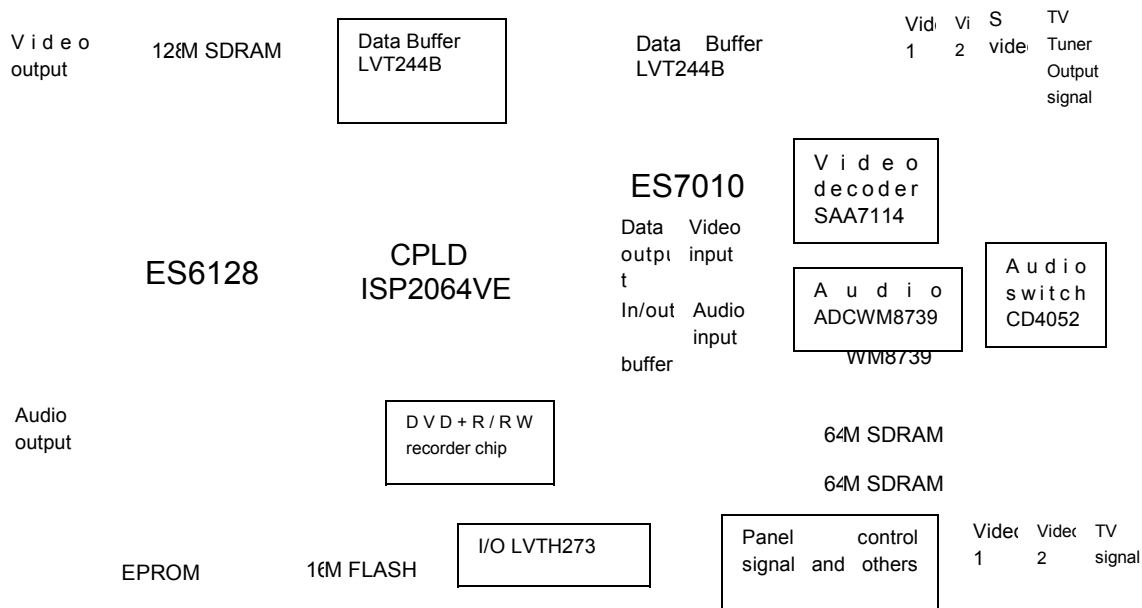

Figure 1、 BSA-3800R mainboard schematic diagram

Send one group of Video 1, or Video 2, or S-video , or TV video signal to SAA7114 video decoder. SAA7114 is apply to the control aspect of video graphic array. It has six groups of separated inputs. After interior software controlled and chosen the original signal, video AD will be transferred to digital signal and output from 81-94 pin. The digital video signal will be sent to ES7010 and ES6128 through the data buffer LVT244B. When it enter into the outside source, digital video signal will be directly outputted the video signal by ES6128 decoder. This way is called "direct signal", it will shorten the time of transferring between signal output and video output, and it can avoid the complicated step of encoding and decoding to make the switch speed of TV

channel be faster. When it recording, the digital video signal will be recorded into DVD+R/RW disc by ES7010 decoder, and then the decoded signal will be sent to ES6128 decoder to output video signal. Three groups of audio signal will be chosen one group to output at 3 and 13 pins through 4 groups multi output CD4052. The chosen audio signal will be transferred into digital audio signal by stereo audio ADC that integrated with WM8739. The digital audio signal will be sent to ES7010 decoder. ES7010 is a MPEG2 audio&video encoding chip. The main frequency of ES70101 is 27MHz. In ES7010, there are one unit of video decoding&decoding transfer, digital audio signal dealer, one CPU with 32 bits, one video input/output unit and one system control unit. Depending on the function, it can use SDRAM. of 8M or 16M. The following is the ES7010 interior diagram：
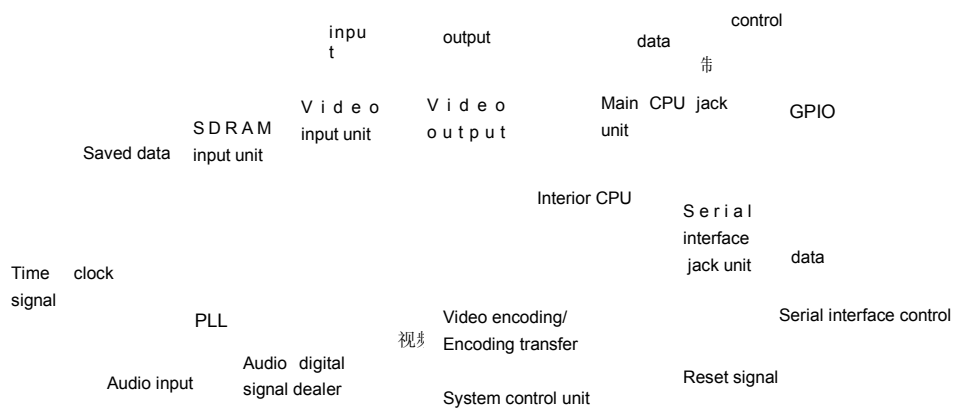
Figure 2、ES7010 interior diagram

ES6128 exchange data with ES7010 by ISPLSI 2064. ISP LSI2064 is a logic equipment that can programme with high density. It including 64 registers, 32 universal I/O jacks,4 special inputs, 3 special time clock inputs. It is integrated with input bus unit, output bus unit and system bus unit. The main function of ISP LSI2064 is controlling the input and output of separated I/O data by software. In whole system, it is used for controlling and harmonize the data transfer among ES7010, ES6128 and recording chip. When it loading a disc, the signal of chip communicating with ES6128. When it recording a disc, ISP LSI 2064 controlling the communication among ES7010, ES6128 and recording chip.
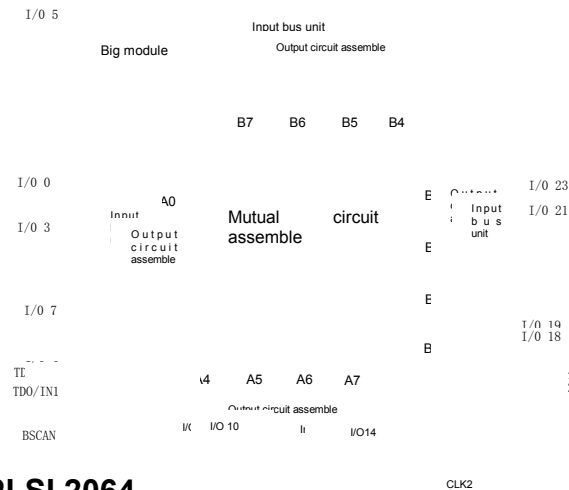
I/0 5

Input bus unit

Big module   Output circuit assemble

B7   B6   B5   B4

I/0 0   E   Output   I/0 23

A0   Input   I/0 21
I/0 3   b u s
Input   Output   Mutual   circuit   unit
         circuit   assemble
         assemble   E

I/0 7   E

                                                    I/0 19
                                                    I/0 18
                                               B

TL
TDO/IN1   A4   A5   A6   A7   3
                                                        2
                      Output circuit assemble

BSCAN   I/(I/O 10   I\   I/O14

CLK2

Figure 3、ISPLSI 2064   interior diagram

ES6128 is a integration with single chip and   MPEG video decoder. It composites progressive video decoding function to make the picture more clear and more real. The main frequency of it is 27MHz. ES6128 can deal the audio data signal and can encode TV signal, it including 4 video DACs and supports Marovision anti-copy function. At the same time, is has DVD system induct function, system control function and manage function. It based on double CPU that is programmable multiplayer, including 32 bits RISC, 64 bits DSP (digital signal processor). The double processor can be connected through two separated data bus. Every processor has its own direct memorizer DMA and outside memorizer jacks. When the system is encoding and decoding, double processor can execute the system command and data dealing. It not only supports parallel ATAPI chip ports but also supports serial ATAPI chip ports, this will makes the audio/video data signal input be possible. The standard I2S audio data will be input to DACs and output to ADCs. High speed EPROM, SDRAM command access, audio/video data buffer. It supports DVD、SVCD, VCD1.1、VCD2.0、Karaoke CD、MP3. Following is the interior diagram of ES6128:
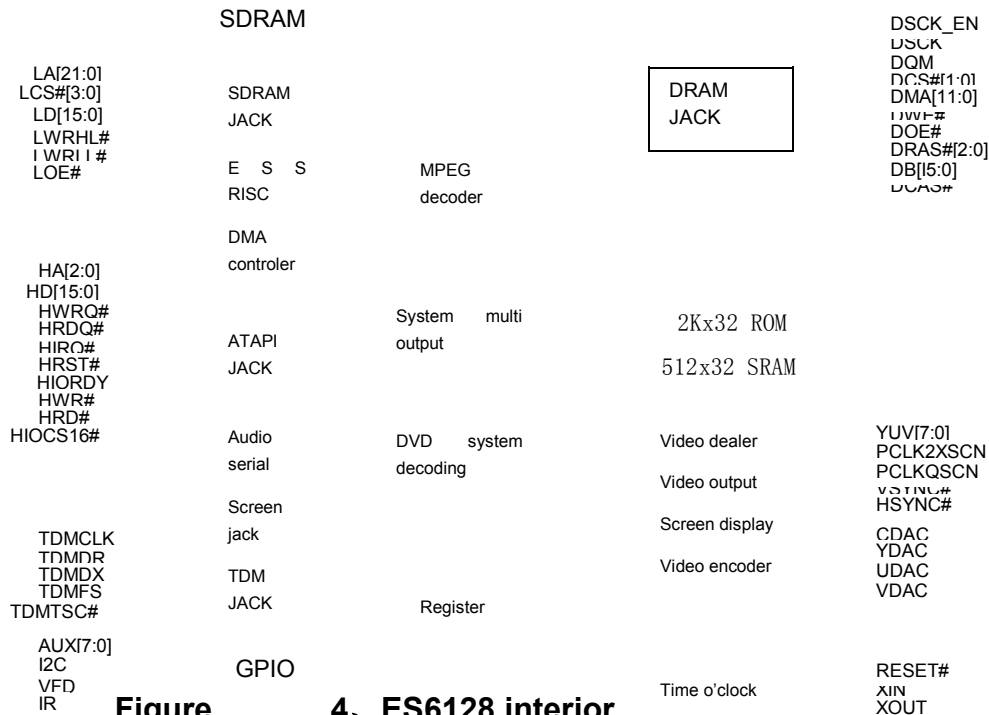
SDRAM

LA[21:0]		DSCK_EN
LCS#[3:0]	SDRAM	DSCK
LD[15:0]	JACK	DQM
LWRHL#		DCS#[1:0]
LWRLL#		DMA[11:0]
LOE#	E S S	MPEG	DRAM	IOWE#
	RISC	decoder	JACK	DOE#
				DRAS#[2:0]
	DMA			DB[I5:0]
	controler			DCAS#

Figure 4、ES6128 interior diagram

Ⅲ. Whole unit circuits analysis

1、Main chip circuit

The main frequency of ES6128 is 121MHz, and it has a external 128Mbit SDRAME, its working voltage is 3.3V or 2.0V. The working voltage of ES7010 is 3.3V or 2.5V. The voltage of workgroup that connecting between mainboard and power supply board is 5V, 3.3V respectively. Its order is 5V GND GND GND 3.3V 3.3V DVDOFF. 3.3V、2.5V、2.0V can be transferred by REG3 (REG-3.3V)、REG11(REG-2.5)、REG1(REG-ADJ) and then outputted at middle pin. The mainboard including reset circuit, time clock circuit, I2C memorize circuit, FLASH software controlling circuit.

2、Reset circuit
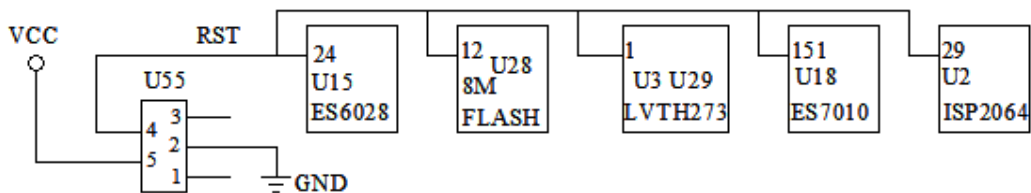
Figure 5、Reset circuit diagram

Reset circuit is composed by reset IC V6300, reset IC PIN5 to 5V power supply, PIN4 output reset signal, PIN2 to GND. After power on, PIN5 produce a signal with 4.5V level. From the above figure, you can see that reset IC U55 provides the reset signal for ES6128, ES7010, 8M FLASH, LVTH273, ISP2064. ES6128、ES7010、8M FLASH、LVTH273、ISP2064. If the reset signal can not work normally, the other composite chips can not work normally, so leading to no picture after power on.

3、The time clock circuit is composed by 27MHz, 24.576MHz crystal oscillator and their multiple frequency circuits. The time clock ACLK of WM8739 can be produced by 24.576MHz crystal oscillator's half frequency. 27MHz crystal oscillator can provide ES6128 and time clock of ES7010. The following is part circuit figure of it:
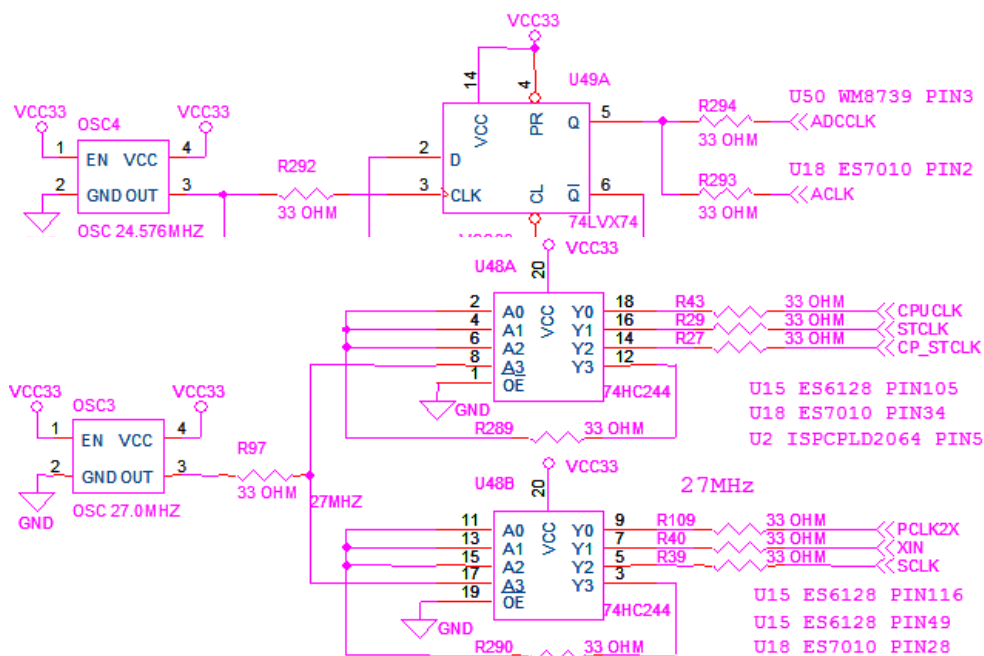
Figure

6、Time clock circuit

From the above figure, you will see that the time clock circuit is mainly composed by 27MHz, 24.576MHz crystal oscillator, so the stability of crystal oscillator count for much the reliability of system. In the case of no picture after power on, you should check 27MHz, 24.576MHz crystal oscillator besides IC reset signal. Check the output frequency of crystal frequency after passing the IC and check the frequency that reached to all composite chips.

4、I2C signal circuit controlled memory 24C01, X1226, video decoding composite SAA7114, TUNER in the whole system. I2C signal check 24C01, SAA7114, TUNER and initialize all these chips in the process of unit power on. 2C signal controlled the signal of 24C01, SAA7114, X1226, TUNER after unit worked. Following figure 7 is about the signal connecting process.
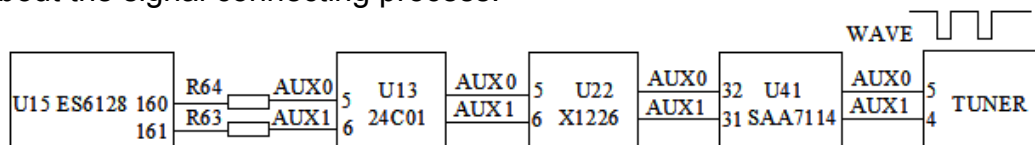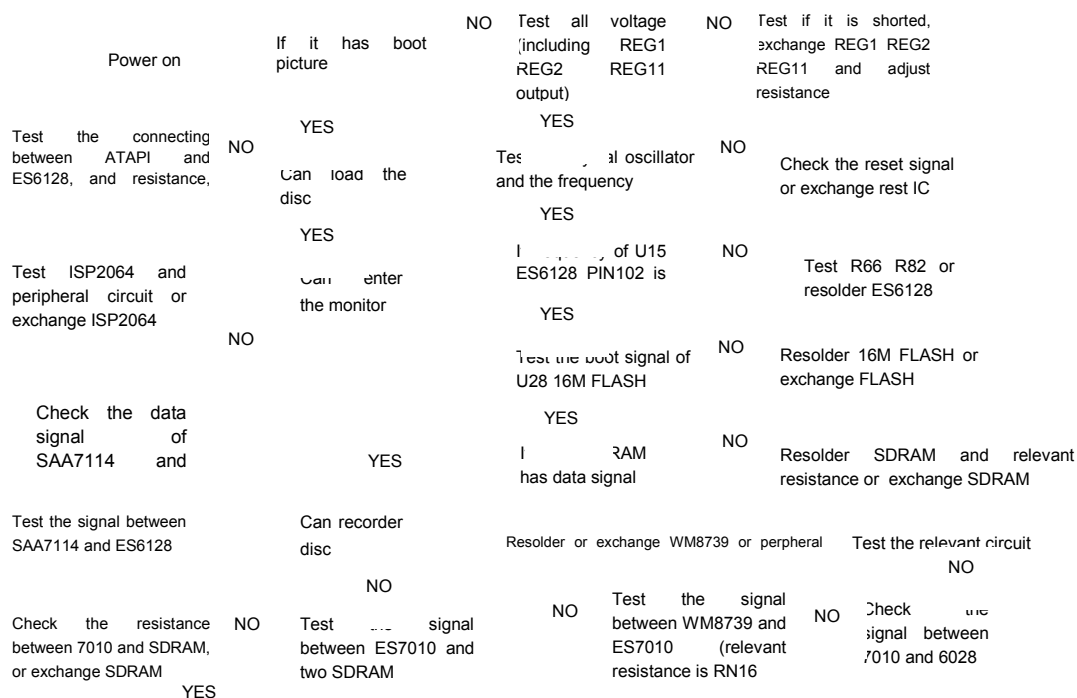

Figure 7、I2C signal connecting

(5) 16M FLASH software controls circuit, the circuit is mainly composed by FLASH and its software. The 16M FLASH controls the work of unit and the software controlling of system. 16M FLASH AM29LV1600B can be re-writable by disc.

Ⅳ **Mainboard troubleshooting check flow**

Mainboard troubleshooting should be in the case of all groups of output voltage of

power supply work normally. You can confirm the troubleshooting took place on chip or on mainboard by exchanging the chip. For example, some chip cannot read disc, it may relevant to the coherency of chip besides the problem of disc. In the checking of mainboard, if it can not display picture after power on, you should check and measure:（1）all the groups of voltage between power board and mainboard, the first group voltage is GND +5V +12V GND –12V, the second group voltage is +5V GND GND GND +3.3V +3.3V OFF. Two groups of voltage can provide to ES6128, its voltage is 3.3V and 2.0V respectively, they are transferred by REG3 and REG1 with 5V level. The voltage can be outputted on the middle pin of REG. The two groups of supply voltage provide to ES7010, and they are 3.3V and 2.5V respectively. 3.3V can be provided directly by power board, and 2.5V is transferred by REG11 with 5V level. Other chips 's supply voltage are 3.3V、5V、+12V、-12V respectively. （2）Check the output of reset signal.（3）If the 27MHz, 24.576MHz crystal oscillator can work normally, and if the frequency to every composite chip's time clock is on the normal standard. Figure 8 is the sketch map of mainboard troubleshooting flow.

Power on

If it has boot picture → NO → Test all voltage (including REG1 REG2 REG11 output) → NO → Test if it is shorted, exchange REG1 REG2 REG11 and adjust resistance

Test the connecting between ATAPI and ES6128, and resistance, → NO

YES

YES

Can load the disc → Test crystal oscillator and the frequency → NO → Check the reset signal or exchange rest IC

YES

YES

Test ISP2064 and peripheral circuit or exchange ISP2064

Can enter the monitor → If ... of U15 ES6128 PIN102 is → NO → Test R66 R82 or resolder ES6128

NO

YES

Test the boot signal of U28 16M FLASH → NO → Resolder 16M FLASH or exchange FLASH

YES

Check the data signal of SAA7114 and

If ... RAM has data signal → NO → Resolder SDRAM and relevant resistance or exchange SDRAM

YES

Test the signal between SAA7114 and ES6128

Can recorder disc

Resolder or exchange WM8739 or perpheral | Test the relevant circuit

NO

NO

Check the resistance between 7010 and SDRAM, or exchange SDRAM → NO | Test the signal between ES7010 and two SDRAM → NO → Test the signal between WM8739 and ES7010 (relevant resistance is RN16 → NO → Check the signal between 7010 and 6028

YES

Figure

8、 Mainboard troubleshooting check schematic diagram

（3）If the main frequency of ES6128 is 121MHz.（4）Test the communicated signal between ES6128 and SDRAM, and test the communicated signal between ES6128 and 16M FLASH.(5) RN15 RN23 RN25 RN30。Test the resistances RN15 RN23 RN25 RN30 of ES7010.

Enter into the situation of monitor, if it takes abnormal picture, you should test the communicated signal between SAA7114 and ES6128, and test the work of SAA7114. If it hang up when it is recording, you should test the following:（1）the

communicated signal between ES7010 and 64M SDRAM.（2）Test the 8 channels of digital video signal between SAA7114 and ES7010. （3）Test the communicated signal between WM8739 and ES7010, the relevant resistance is RN16.（4）Test the output of ES7010 to LVT244B and the data buffer which composed with LVT374. Test the 8 channels of digital video signals, the relevant resistances are RN20, RN24.（5）Test the digital video data signal of data buffer to ISP2064 and ES6128.

The mainboard and output board have composite output, S-video, RCA video output,. Audio output has 5.1 CH audio output, optical , coaxial digital audio output. It includes 5.1 channel audio DA circuit, audio amplify circuit, optical and coaxial output circuits, SCART audio/video output circuit. SCART SCART circuits is composed with three SCART controlling signal lines and one audion controlling circuits. It can switch different AV situations of TV with SCART port by voltage level's high and low. Three SCART lines produce high and low voltage level signal by LVTH273 of mainboard, it can control the audion. Optical and coaxial circuit is built by the digital audio signal which outputted by mainboard then amplified by VHCU04, at last it will output at the coaxial jack. The video output circuit is mainly about mainboard output all kinds of video signals, these signals can be outputted on all kinds of video output jacks after matching the circuits. The mainboard outputs digital signal and transferred to 6 channels audio by PCM1606 DAC transfer circuits, and then the 6 channels 's audio would be output after amplified by amplified circuits. This process can build 5.1 channel output circuit. The main trouble displays that there is no sound from 5.1 channels, or no audio output from one group of 5.1 channels, or there is no audio signal from optical and coaxial. If it takes troubles, you should analyze the troubles from back to forward step by step. If it has no audio output, you should check RC4558 amplifier and the process of digital audio to simulate audio.

Ⅴ.**Power supply board troubleshooting flow**

Power on

If it has +5V output   NO → Check DZ1(4V7 regulator), D1(31DQ04) and peripheral circuit   If transformer has output

YES

If it has +3.3V output   NO → Check D2 D3 and peripheral circuit

YES

If it has –12V output   NO → Check DZ2 D5 RF1(especially RF1) and peripheral circuit

YES   YES

If it has +12V output   NO → Check DZ3 DZ4 D6 and peripheral circuit

YES

If the other has +5V output   NO → Check DZ5 D7 D8 and peripheral circuit

If it has +3.5V between D+ and D-   NO → Check DZ7 R23 R24 D10 and peripheral circuit

YES

If it has –24V output   NO → Check DZ6 D11 and peripheral circuit   Exchange transformer

YES

The power supply work normally

Figure 9、Power supply board troubleshooting schematic diagram

Ⅵ. **Maintenance Example:**

（1）One BSA-3800R player with nothing displays on LCD screen, check the power-supply part and find there is no –24V voltage output. Then find D11 is invalid, exchange it.

（2）One BSA-3800R player loading a disc with 5.1 CH, find there is no sound from surround left, and surround right. Then find the sound signal is normal before amplified by RC4558, so can confirm that RC4558 is invalid, exchange it.

（3）One BSA-3800R player is found that there is no audio output from 5.1 CH, find it is still has no sound before amplified by RC4558, so exchange PCM1606 DAC.

（4）One BSA-3800R player neither has sound from 5.1 CH, nor –12V voltage output, then check to find RF1 10Ω safety resistance is invalid, exchange it.

（5）One BSA-3800R player switch to different video output, when it is connecting with SCART TV. For example: after S-VIDEO system switch to Y /PB/PR system, TV can not switch automatically to AV input. Check and find there is one audion among four audions is invalid, exchange it.

（6）One BSA-3800R player cannot display picture after turning on. Check and find there is no +5V, 3.3V voltage output from power supply board, and find there is no

voltage output from transformer, exchange transformer so the trouble is removed.

（7）One BSA-3800R player cannot display picture after turning on. Check the voltage of mainboard is normal, the outputs of REG1 REG2 REG11 are normal too. Test the frequency of crystal oscillator, it's normal, then find the reset signal is abnormal, exchange the reset IC so the trouble is removed.

（8）One BSA-3800R player cannot display picture after turning on. Check voltage, reset signal and crystal oscillator circuit, all of them work normally. Then check the main frequency of main chip ES6128 PIN102 is incorrect, find the resistance of PLL is broken, re-solder the chip .

（9）One BSA-3800R player cannot display picture after turning on. Check voltage, reset signal, crystal oscillator circuit and main frequency of ES6128, all of them work normally. Find that there is no communicated signal between ES6128 and SDRAM, but there is communicated signal between ES6128 and 16M FLASH, re-solder SDRAM, but there is still no signal between them. Re-solder the resistances between ES6128 and SDRAM, so the trouble removed.

（10）One BSA-3800R cannot read, and after replacing mechanism the trouble still exists. Re-solder pins between ES6128 and APAPI port, re-solder ISP2064 and re-solder the resistances between ES6128 and APAPI port, the trouble still exists. May ISP 2064 is invalid, exchange it and the trouble removed.

（11）One BSA-3800R player cannot enter into the situation of connecting external signal, find there is one signal of 8 signal lines between the communication of SAA7114 and ES6128. Re-solder the resistances, the trouble is removed.

（12）One BSA-3800R player is hang-up when it is recording with external signal, check the communication between ES7010 and SAA7114, and check the communication between ES7010 and 64M SDRAM, all of them are work normally. Then find there is no signal between ES7010 and ISP2064, and neither signal between ES7010 and WM8739, so may WM8739 is invalid, exchange it and the trouble is removed.

（13）One BSA-3800R player is hang-up when it is recording with external signal. The signals of above are normal, but there is no signal output after passing data buffer that is composed by LVT244B and LVTH374. Find there is a bad solder dot on the LVT244B leads to LVT244B cannot work, re-solder it and the trouble is removed.

（14）One BSA-3800R player has picture but sound when it connecting with TV, find there is audio signal exists before CD4052, but not exists after it. Check the voltage of chip, re-solder it ,the trouble still exists, so find CD4052 is invalid.

（15）One BSA-3800R player's clock cannot work normally, exchange the U22 X1226 and 32.768KHZ crystal oscillator, the trouble still exists. Exchange 3.6V battery, the trouble still exists. Check diode between D4 BAT54 audion and battery, exchange BAT54, so the trouble is removed.